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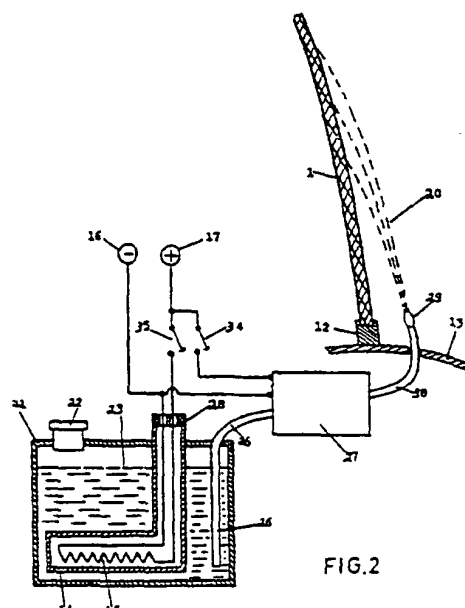
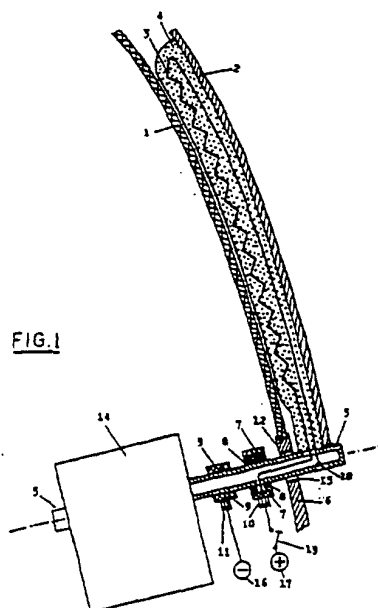
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(58) Field of Search

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INT CL⁶ B60S 1/38

(54) Heated windshield wiper and washer systems

(57) A wiper and washer system for a motor vehicle windshield that can melt ice on a windshield, comprises a wiper blade 4, wiping means 2, 5, and 14 for wiping the blade 4 across the windshield 1 and electric heating means 3, 10, 11, 16, 17, and 18 for heating the wiper blade 4. In use, the wiper blade 4 may be heated and moved across the windshield 1 in order to transfer heat from the blade 4 to melt any ice on the windshield. A washer system (Figure 2) comprises a tank 21 filled with a washer liquid and having an electric heater 25 therein to heat the liquid, a liquid pump 27 and a nozzle 29 for spraying the liquid on to the windshield. In use the liquid may be heated and sprayed on to the windshield in order to transfer heat from the liquid to melt any ice on the windshield.



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Windshield Wiper and Washer Systems

Background of the Invention

5 This invention relates to wiper and washer systems for a windshield or other window of a motor vehicle, and in particular to wiper and washer systems that can melt ice on a windshield.

10 During freezing winter weather it is necessary before driving a motor vehicle to mechanically remove any ice from the windshield and other windows, usually by scraping with a sharp scraper blade. This is a time consuming and tiresome process, which often results in scratching the
15 glass.

It is an object of the present invention to provide a system that provides speedy and direct removal of ice from a windshield or other window of a motor vehicle during
20 operation of wiper blades, in order to save time and prevent any scratching of the windshield glass.

Summary of the Invention

25 Accordingly, the invention provides a wiper system for melting ice on a motor vehicle windshield, comprising a wiper blade, wiping means for wiping the blade across the windshield and electric heating means for heating the wiper blade, in which the wiper blade may be heated and
30 moved across the windshield in order to transfer heat from the blade to melt any ice on the windshield.

The blade is preferably of an elastic or flexible material, and conforms closely with the surface of the
35 windshield.

The blade is also preferably electrically insulating so that the heating means may have an electrical wire insulated within the blade.

- 5 The heating means may also have a manually operable electrical switch to activate the heating means.

Also according to the invention, there is provided a washer system for melting ice on a motor vehicle
10 windshield, comprising a tank filled with a washer liquid and having an electric heater therein to heat the liquid, a liquid pump and a nozzle for spraying the liquid on to the windshield, in which the liquid may be heated and sprayed on to the windshield in order to transfer heat
15 from the liquid to melt any ice on the windshield.

All parts of the washer system, such as the tank, pipes, pump and nozzle need to be made from a material which can withstand higher temperatures of said hot liquid.

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The washer system may additionally comprise a wiper system having a wiper blade and wiping means for wiping the blade across the windshield. Then the liquid, when sprayed on the windshield, may be wiped across the windscreen by the
25 wiper blade to melt any ice on the windshield. Such a wiper system may have electric heating means for heating the wiper blade so that the wiper blade may be heated and moved across the windshield with the heated liquid in order to transfer heat from the blade to melt any ice on
30 the windshield. The combination of the wiper system and washer system is particularly advantageous, because the presence of the liquid will aid heat flow from the heated blade to the windshield.

Brief Description of the Drawings

The invention will now be further described by way of example with reference to the accompanying drawings, in which:

- Figure 1 shows an exemplary embodiment of a wiper system according to the present invention; and
- Figure 2 shows an exemplary embodiment of a washer system according to the present invention.

Detailed Description of the Drawings

Referring first to Figure 1, an electric windshield wiper motor 14 drives a hollow tubular drive shaft 5. The shaft 5 passes through an aperture 15 between a chassis panel 6 and windshield lower frame 12 to be connected to a wiper arm 2. A wiper blade 4 for wiping a motor vehicle glass windshield 1 is connected to the wiper arm 2. The motor 14 repeatedly drives the wiper blade 4 back and forth over an arc across the windshield 1 in a known manner. The motor vehicle will most generally have more than one such windshield wiper.

The wiper blade 4 is made from an flexible material which, as will become apparent below, needs to be able to withstand elevated temperatures, for example being made from a tetrafluro-ethylene resin such as that sold under the trade mark TEFLON. A lower cost alternative could be a suitable synthetic rubber material.

The blade 4 is moulded around and encapsulates a heater wire 3. One terminal of the heater wire 3 is connected through the base of the blade and through a wire passing

through the hollow drive shaft 5 to an arcuate metallic contact plate 7 on the exterior of the drive shaft 5. The contact plate 7 is insulated from the drive shaft 5 by an insulation strip 8.

5

The contact plate 7 provides an electric contact to a brush 10 which sweeps across the plate 7 as the drive shaft 5 is rotated. The brush 10 is connected via a switch 19 to a terminal 17, which will most commonly be the positive terminal of a motor vehicle battery in the case of a motor vehicle with a negative earth chassis.

The second terminal of the heater wire 3 is soldered at point 18 to a surface inside the tubular shaft 5. The electrical connection to the other battery terminal 16, here a negative terminal is made in a similar manner to that described above for the positive terminal 17, through another arcuate contact strip 9 on the drive shaft 5 and another brush 11.

20

In cold weather when the windshield is frosted, the switch 19, which will be conveniently located within a passenger compartment, should be turned on. An electric current will then flow from the battery through the heater wire 3, heating up the wiper blade 4. When the wiper motor is activated to drive the wiper blade repeatedly across the windshield 1, heat will be transferred from the wiper blade to the windshield, causing any ice or frost on the glass to melt down. In this way is possible to avoid having to scrape the windshield since the ice or frost will, in most circumstances, be quickly melted, thus avoiding any need to scrape the glass with the attendant risk of scratching of the glass.

35 The wiper blade 4 is described above as being permanently

wired to the contact strips 7,9 in the tubular drive shaft 5. The wiper blade may, of course, become worn with age and use. If the wiper blade is made from a very durable material such a TEFLON (trade mark) material, then the blade need not be removable from the wiper arm 2 and tubular shaft 5, and the full assembly of the shaft 5, arm 2 and blade 4 may be removed and replaced when the blade becomes worn. However, if the blade is made from a less durable material such as a synthetic rubber material such that it needs to be replaced more frequently, then it may be preferable to have an electrical connector at the base of the blade so that only the worn blade itself needs to be replaced.

The wiper arm 2 may, of course, be replaceable in a known manner.

If the wipers are to be used in freezing weather to wash or clean the windshield, then any washer fluid must be prevented from freezing, both in a reservoir tank or in pipes leading to a spray nozzle. Car producers generally recommend use of a washer fluid containing an antifreeze. This however, is expensive and inconvenient. Some antifreeze solutions may also damage the vehicle's paint.

Figure 2 shows a washer arrangement that according to the present invention prevents the water in the washer tank from freezing, and that also delivers heated fluid to melt any ice on the windshield. A water tank 21 is filled up with water 23, through an inlet 22. Inside the tank 23 there is a hermetically sealed tube 24. A heater wire 25 passes through a stopper 28 into the tube 24. One terminal of the heater wire 25 is connected to a terminal 16, preferably the negative terminal, of the motor vehicle's battery. The other terminal is switched via a

switch 35 to the other terminal 17, preferably the positive terminal of the battery.

5 A tube 26, draws water from the tank 21 to a liquid pump 27. When a pump switch 34 is turned on, the pump 27 pumps water under pressure through another tube 38 and a nozzle 29 in a bonnet 13 to spray the water 10 the glass of the windshield 1.

10 In cold weather, the switch 35 should be turned on. Then, an electric current will flow through the heater wire 25, and heat up the water 23 in the tank 21. The hot water will be spread on the windshield 1 by means of the nozzle 29, due to the pressure created by the pump 27.
15 Wiper blades may then be used to spread the heated washer liquid over the windshield, thus melting any ice and washing the glass.

20 For proper defrosting and cleaning of the windshield in a cold weather it may be necessary to energize the heater of the washer and the heater of the wiper systems together.

25 For small cars, either the heater wiper system alone or the heater washer alone, may be satisfactory. In a larger vehicle, the combination of systems allows convenient de-icing and cleaning of windshields in freezing weather.

Claims

1. A wiper system for melting ice on a motor vehicle windshield, comprising a wiper blade, wiping means for
5 wiping the blade across the windshield and electric heating means for heating the wiper blade, in which the wiper blade may be heated and moved across the windshield in order to transfer heat from the blade to melt any ice on the windshield.
- 10 2. A wiper system as claimed in Claim 1, in which the blade is made from electrically insulating material, and the heating means has an electrical wire insulated within the blade.
- 15 3. A wiper system as claimed in Claim 1 or Claim 2, in which the heating means has a manually operable electrical switch to activate the heating means.
- 20 4. A washer system for melting ice on a motor vehicle windshield, comprising a tank filled with a washer liquid and having an electric heater therein to heat the liquid, a liquid pump and a nozzle for spraying the liquid on to the windshield, in which the liquid may be heated and
25 sprayed on to the windshield in order to transfer heat from the liquid to melt any ice on the windshield.
- 30 5. A washer system as claimed in Claim 4, additionally comprising a wiper system having a wiper blade and wiping means for wiping the blade across the windshield, in which the liquid when sprayed on the windshield may be wiped across the windscreen by the wiper blade to melt any ice on the windshield.
- 35 6. A washer system as claimed in Claim 5, in which the

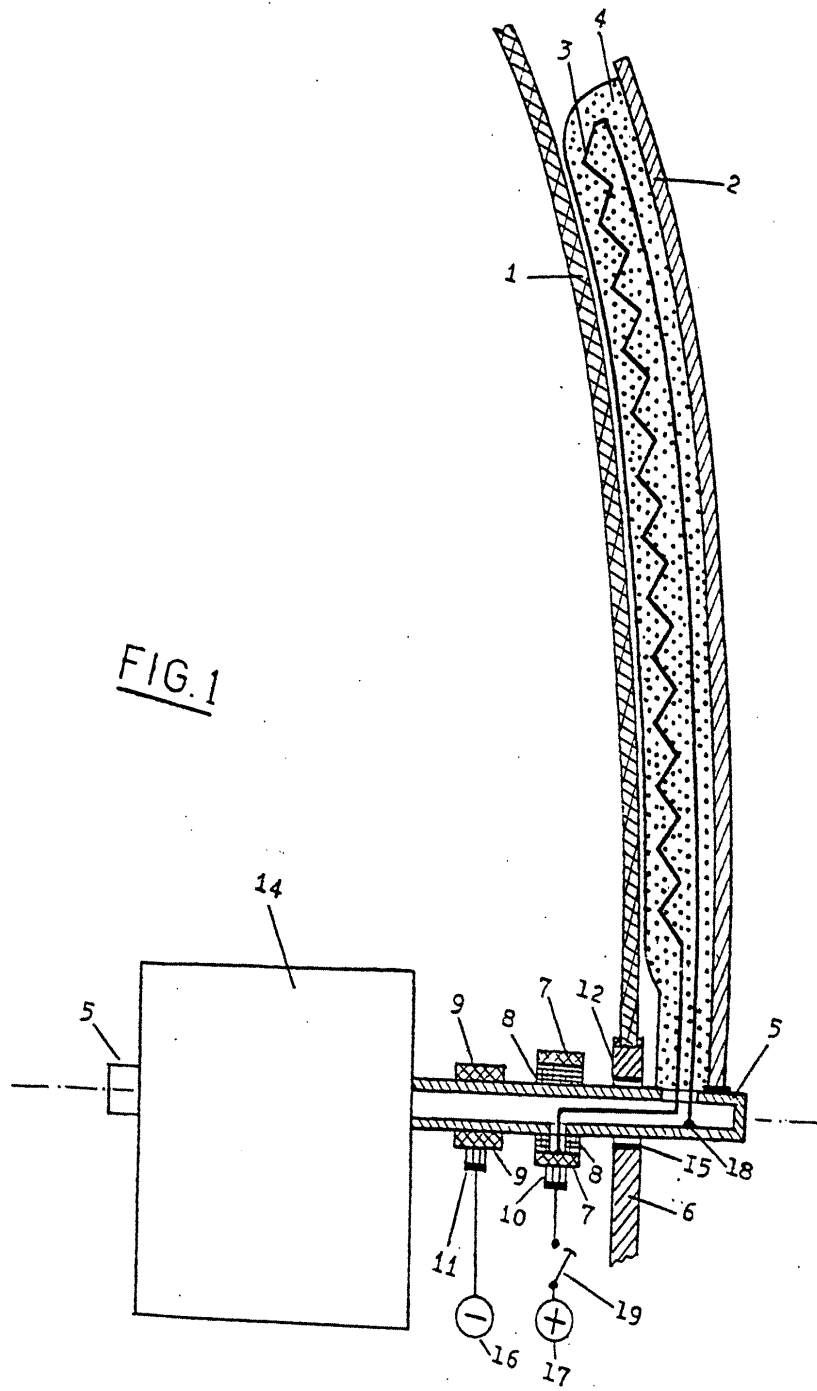
wiper system is as claimed in any one of Claims 1 to 3.

5 7. A wiper system substantially as herein described,
with reference to and as shown in the accompanying
drawings.

8. A washer system substantially as herein described,
with reference to and as shown in the accompanying
drawings.

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FIG. 1



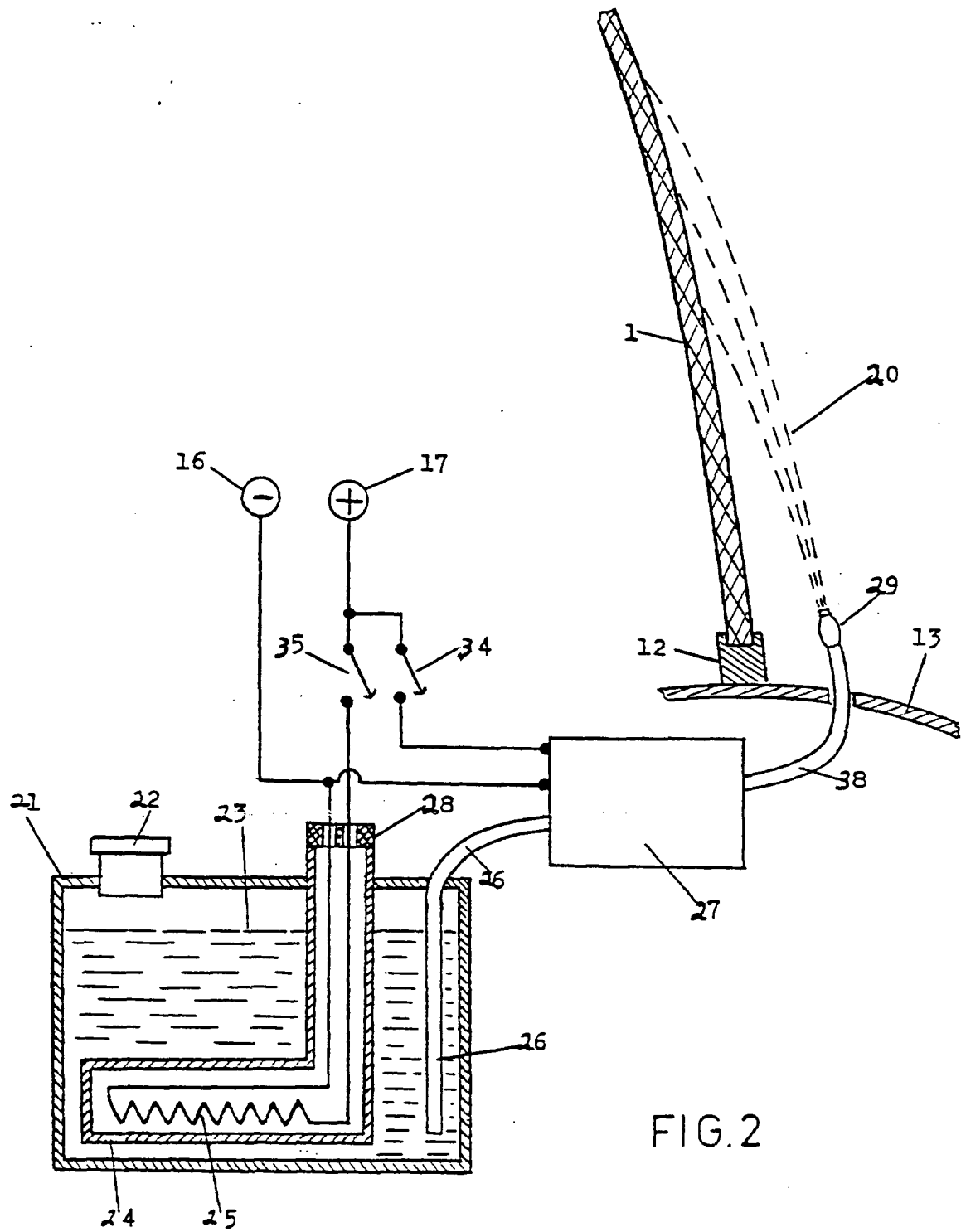


FIG. 2